

## **Appendix 3-D**

### **Tank Seam Access Road Vegetation**

## **Introduction**

The following pages are a copy of a report prepared by Patrick Collins, Ph.D., Biologist/Reclamation Specialist, of Mt. Nebo Scientific. The report presents an evaluation of the pre-disturbed vegetation in the area of the Tank Seam Access Road and pad and a comparison of the data to data collected for the selected reference area. The vegetation survey was performed in October, 1992, and the reference area was sampled in July, 1993.

***VEGETATION SAMPLING  
OF  
PROPOSED DISTURBED  
TANK SEAM ACCESS ROAD***

Prepared by

**MT. NEBO SCIENTIFIC RESEARCH & CONSULTING**  
330 East 400 South, Suite 6  
P.O. Box 337  
Springville, Utah 84663  
(801) 489-6937

for

**CO-OP MINING COMPANY**  
P.O. Box 1245  
Huntington, Utah 84528

**Report: Patrick Collins, Ph.D.**

**Fieldwork: Patrick Collins  
Dean Collins**

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Fieldwork Date: October 1992**



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**VEGETATION SAMPLING  
OF THE  
PROPOSED DISTURBED  
TANK SEAM ACCESS ROAD**

**SCOPE**

The purpose of this document is to provide baseline information of the existing vegetation of an area that is proposed for new disturbance.

**INTRODUCTION**

General Site Description

The CO-OP Mining Company has proposed to construct an access road in their permit area which will require disturbance to the native plant community. The proposed disturbance lies within Bear Canyon. Bear Canyon, a branch of Huntington Canyon, is located west of the city of Huntington in Emery County, Utah. Slopes that surround the canyon are primarily dominated by pinyon-juniper and mountain brush communities. In their native, undisturbed state, the canyon bottoms are comprised chiefly of

sagebrush/grass and riparian communities.

Bear Canyon maintains active mine facilities. Several areas have been disturbed as a result of the mine activities and some of these areas have been reclaimed and reseeded.

## METHODS

Quantitative and qualitative data were taken on the sample sites. Sampling was accomplished in October 1992, before appreciable frost that could affect the results.

### Transect Placement

The corridor of the proposed disturbed access road had been previously surveyed and flagged. Regular points at 50 ft intervals were located along the entire length of the proposed road. Sampling quadrats were placed at these points.

### Cover and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on data sheets were: estimated precipitation, erosion,

slope, exposure, grazing use, animal disturbance and other appropriate notes.

### Woody Species Density

Density of woody plant species were recorded using the point quarter distance method and by using belt transects. In the point quarter method, the aforementioned regular points were placed on the sample sites and delineated into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average point-to-individual distance was equal to the square root of the mean area per individual.

### Sample Adequacy

Sampling adequacy for woody species density and cover was achieved using formulas from "Statistical Methods" (Snedocor and Cochran 1980), with the goal that at least 80% of the samples were within 10% of the true mean for the plant communities of the area. The formula used is given below.

$$n_{min} = \left[ \frac{1.28 (s)}{x (.1)} \right]^2$$

where,

nmin = minimum adequate sample  
s = standard deviation  
x = sample mean  
.1 = confidence interval

## Photographs

Color photographs of the sample area were taken at the time of sampling and were submitted with this report.

## Raw Data

The raw data were also submitted with this report which would facilitate future scrutiny of the data and further statistical testing if desired.

## **RESULTS**

Rock was the major contingent for the ground cover and was estimated at 56.00%. Total living cover of the site was estimated at 19.50% (Table 2). Grasses dominated the cover and comprised of almost 75% of the living cover (Table 2). The dominate grass species was Salina wildrye (*Elymus salinus*) and was estimated at 10.58% cover. Mountain mahogany (*Cercocarpus ledifolius*) was the most common woody species followed by pinyon pine (*Pinus edulis*) and Utah Juniper (*Juniperus osteosperma*). For a list of cover by species, refer to Table 3.

Woody species density was estimated at 394 individuals per

acre (Table 4) by the point quarter method. Again, the most abundant species was mountain mahogany followed closely by pinyon pine.

TABLE 1:

CO-OP MINE AREA  
QUALITATIVE SAMPLING DATA SHEET AND  
QUANTITATIVE/QUALITATIVE NOTES  
1992

SITE NAME: Reclaimed Pads

AREA: TRAIL CANYON

DATE: 10 October 1992

WORKERS: P. Collins, D. Collins

SLOPE: Approx. 30 deg.

EXPOSURE: N, E, S (predominately E)

ANIMAL USE/DISTURBANCE: Moderate deer use

EROSION: Slight

COVER: (see quantitative data)

DOMINANT PLANT SPECIES OBSERVED: (see quantitative data)

NOTES:

- 1) (see report)

**TABLE 2:** Total cover and composition summary for the Proposed Disturbed Tank Seam Access Road at the CO-OP Mine.

<b>TOTAL COVER</b>	<b>% MEAN COVER</b>	<b>STANDARD DEVIATION</b>	<b>SAMPLE SIZE</b>
Living Cover	19.50	6.87	40
Litter	12.13	13.95	40
Bareground	12.38	9.86	40
Rock	56.00	19.18	40
<b>COMPOSITION</b>			
Shrubs	25.46	37.45	40
Forbs	0.00	0.00	40
Grasses	74.54	37.45	40



**TABLE 3: Species cover and frequency summary for the Proposed Disturbed Tank Seam Access Road at the CO-OP Mine.**

<b>SPECIES</b>	<b>% MEAN COVER</b>	<b>STANDARD DEVIATION</b>	<b>SAMPLE SIZE</b>	<b>RELATIVE FREQUENCY</b>
<b>TREES &amp; SHRUBS</b>				
<i>Ceratoides lanata</i>	2.13	5.11	40	20.00
<i>Juniperus osteosperma</i>	0.63	3.90	40	2.25
<i>Pinus edulis</i>	2.00	5.45	40	12.50
<b>FORBS</b>				
<b>GRASSES</b>				
<i>Elymus cinereus</i>	13.88	10.58	40	80.00
<i>Stipa hymenoides</i>	0.88	3.52	40	7.50

**TABLE 4:** Woody species densities of the Proposed Disturbed Tank Seam Access Road at the CO-OP Mine.

	NUMBER/ACRE
<i>Cercocarpus ledifolius</i>	177.08
<i>Chrysothamnus nauseosus</i>	14.76
<i>Juniperus osteosperma</i>	56.57
<i>Pinus edulis</i>	142.65
<i>Pseudotsuga menziesii</i>	2.46
	<hr/>
TOTAL	393.51

## ***COLOR PHOTOGRAPHS***



SAMPLE AREAS FOR THE PROPOSED DISTURBED TANK SEAM ACCESS ROAD (OCT. 1992)





## ***APPENDIX: RAW DATA***

SITE: Tank Seam Access Road

(Proposed Disturbed)

AREA: CO-OP MINE - BEAR CANYON

SLOPE: 34 deg

EXPOSURE: N,E,S, Predominantly E

WORKERS: R & P Collins

DATE: 10 Oct 1992

	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
<hr/>										
SHRUBS										
<i>Pinus edulis</i>	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00
<i>Cercocarpus ledifolius</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Juniperus oostersperma</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

#### FORBS

GRASSES										
<i>Elymus salinus</i>	20.00	5.00	25.00	20.00	0.00	35.00	25.00	10.00	5.00	20.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00

Total Living Cover	20.00	25.00	25.00	20.00	10.00	35.00	25.00	15.00	25.00	20.00
Litter	5.00	5.00	50.00	10.00	5.00	40.00	5.00	5.00	25.00	5.00
Bareground	15.00	10.00	10.00	35.00	20.00	15.00	5.00	5.00	20.00	50.00
Rock	60.00	60.00	15.00	35.00	65.00	10.00	65.00	75.00	30.00	25.00

% COMPOSITION										
Shrubs	0.00	80.00	0.00	0.00	0.00	0.00	0.00	33.33	80.00	0.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	100.00	20.00	100.00	100.00	100.00	100.00	100.00	66.67	20.00	100.00

11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	15.00	0.00	0.00	0.00	10.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

10.00	10.00	25.00	0.00	5.00	35.00	25.00	5.00	10.00	20.00	25.00	10.00	0.00
0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00

10.00	10.00	25.00	20.00	10.00	35.00	25.00	20.00	10.00	20.00	25.00	20.00	10.00
5.00	5.00	65.00	5.00	5.00	5.00	10.00	10.00	5.00	5.00	5.00	5.00	5.00
10.00	15.00	5.00	5.00	10.00	10.00	10.00	10.00	25.00	5.00	5.00	5.00	5.00
75.00	70.00	5.00	70.00	75.00	50.00	55.00	60.00	60.00	70.00	65.00	70.00	80.00

0.00	0.00	0.00	0.00	50.00	0.00	0.00	75.00	0.00	0.00	0.00	50.00	50.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	100.00	50.00	100.00	100.00	25.00	100.00	100.00	100.00	50.00	50.00

24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00
0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

25.00	0.00	30.00	20.00	10.00	5.00	10.00	10.00	10.00	25.00	20.00	20.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

25.00	25.00	30.00	20.00	20.00	10.00	10.00	10.00	10.00	25.00	20.00	20.00	15.00
10.00	10.00	5.00	5.00	45.00	3.00	10.00	2.00	25.00	5.00	10.00	20.00	5.00
5.00	5.00	20.00	5.00	5.00	2.00	25.00	3.00	20.00	10.00	5.00	20.00	30.00
60.00	60.00	45.00	70.00	30.00	85.00	55.00	85.00	45.00	60.00	65.00	40.00	50.00

0.00	100.00	0.00	0.00	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	100.00	100.00	50.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00



SITE: Tank Seam Access Road

AREA: CO-OP MINE - BEAR CANYON

SLOPE: 34 deg

EXPOSURE: N,E,S, Predominantly E

WORKERS: R & P Collins

DATE: 10 Oct 1992

37.00	38.00	39.00	40.00	Mean	StDev	Freq
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#### SHRUBS

0.00	0.00	15.00	0.00	2.00	5.45	12.50	Pinus edulis
0.00	20.00	0.00	20.00	2.13	5.11	20.00	Cercocarpus ledifolius
0.00	0.00	0.00	0.00	0.63	3.90	2.25	Juniperus ostersperma

#### FORBS

#### GRASSES

25.00	0.00	0.00	0.00	13.88	10.58	80.00	Elymus salinus
0.00	0.00	0.00	0.00	0.88	3.52	7.50	Stipa hymenoides

25.00	20.00	15.00	20.00	19.50	6.87	Total Living Cover
10.00	5.00	15.00	10.00	12.13	13.95	Litter
10.00	5.00	10.00	10.00	12.38	9.86	Bareground
55.00	70.00	60.00	60.00	56.00	19.18	Rock

#### % COMPOSITION

0.00	100.00	100.00	100.00	25.46	37.45	Shrubs
0.00	0.00	0.00	0.00	0.00	0.00	Forbs
100.00	0.00	0.00	0.00	74.54	37.45	Grasses